CLAIMS

1. A reconfigurable multiple electrode lead system, comprising:

an elongated medical electrical lead and delivery system that delivers at least three individually addressable electrodes into more than one cardiac vein site along the epicardial surface of the ventricular wall, wherein each of said at least three individually addressable electrodes are configured to electrically couple to a one of at least three discrete segments of the LV cardiac tissue, and wherein said at least three discrete segments of LV cardiac tissue comprises: an apical portion, a mid-basal segment and an apical segment, along either an anterior, posterior or lateral plane; and

an implantable pulse generator operatively coupled to a proximal portion of said elongated medical electrical lead, said implantable pulse generator further comprising:

means for sensing cardiac events,

means for measuring intrathoracic impedance by injecting direct current signals using a one of the at least three individually addressable electrodes and calculating a resulting impedance value,

means for delivering diverse electrical therapies, and

means for optimizing cardiac pacing intervals by individually addressing at least a pair of said at least three individually addressable electrodes, and, as applicable, applying programmably-timed pacing-level electrical stimulation.

2. A system according to claim 1, wherein the diverse electrical therapies includes a cardiac resynchronization therapy.

3. A system according to claim 1, wherein the diverse electrical therapies includes a paired or coupled pacing therapy.

4. A system according to claim 3, wherein the paired or coupled pacing therapy is delivered to a ventricular chamber.

5. A system according to claim 1, wherein in the event that one or more of said at least three individually addressable electrodes provides an in-appropriate signal or loses ability to provide adequate electrical stimulation to the cardiac tissue, said sensing means including means for switching to another one of the said electrodes.

6. A system according to claim 1, further comprising:
at least one mechanical sensor adapted to provide an output signal related to mechanical cardiac performance, wherein said at least one mechanical sensor conveys said output signal to the implantable pulse generator, and wherein said output signal optionally couples to said sensing means to provide a confirmatory signal for optimizing the programmably-timed pacing-level electrical stimulation.

7. A system according to claim 6, wherein said at least one mechanical sensor comprises a one of:

an accelerometer, a pressure sensor, an acoustic sensor, an oxygen sensor.

8. A system according to claim 7, wherein said accelerometer comprises a one of: a single axis accelerometer, a multi axis accelerometer, a piezoelectric accelerometer.

9. A system according to claim 8, wherein said accelerometer couples to said medical electrical lead and is adapted to be deployed through a portion of a coronary sinus and disposed in a mechanical communication with a portion of LV tissue.

10. A system according to claim 6, wherein said pressure sensor couples to said implantable pulse generator and is adapted to be deployed through a blood vessel.

11. A system according to claim 1, wherein said switching means further comprises means for altering connections among said implantable pulse generator and said one or more of said at least three individually addressable electrodes to eliminate or reduce said inappropriate signal.

12. A multiple electrode, fault-tolerant medical electrical lead adapted for deployment into a portion of a coronary sinus, a great vein, or branches of the great vein, comprising:

an elongated electrified biocompatible lead member;

at least three spaced-apart electrodes coupled to a distal portion of the lead member and in electrical communication with a means for addressing each of said at least three spaced-apart electrodes; and

a means for manually guiding said distal portion of the lead member into a portion of a coronary sinus, a great vein, or branches of the great vein so that each of said at least three spaced-apart electrodes are disposed in intimate electrical communication with a different discrete volume of cardiac tissue.

13. A medical lead according to claim 12, wherein said different discrete volume of cardiac tissue further comprises:

a basal volume of ventricular tissue, a lateral volume of ventricular tissue, a mid-lateral volume of ventricular tissue, an apical volume of ventricular tissue.

14. A medical lead according to claim 13, wherein said a different discrete volume of cardiac tissue further comprises:

an anterior, anteroseptal, inferoseptal, inferior, inferolateral, or anterolateral portion of the basal volume of ventricular tissue;

an anterior, anteroseptal, inferoseptal, inferior, inferolateral, or anterolateral portion of the lateral volume of ventricular tissue; or

an anterior, anteroseptal, inferoseptal, inferior, inferolateral, or anterolateral portion of the mid-lateral volume of ventricular tissue.

15. A medical lead according to claim 12, wherein at least one of the at least three electrodes comprises a tip electrode having an axial bore formed through a portion of said tip electrode; and wherein the means for manually guiding said distal portion of the lead member comprises:

a guide wire slidingly engaging said axial bore.

16. A medical lead according to claim 15, wherein said distal portion comprises a bifurcated lead portion and wherein at least one of the at least three electrodes mechanically and electrically couples to the bifurcated lead portion, and further comprising:

a second tip electrode having a second axial bore formed through a portion of said tip electrode; and wherein the means for manually guiding said distal portion of the lead member comprises a second guide wire slidingly engaging said second axial bore.

17. A medical lead according to claim 16, further comprising an elongated axial lumen formed within a body portion of the medical lead and terminating at a bifurcated junction and further comprising a relatively resilient Y-shaped member disposed at the bifurcated junction, said relatively resilient Y-shaped member adapted to receive the first and second guide wire at a proximal passageway and receive only a one of said first and second guide wire in each of two distal passageways.

18. A medical lead according to claim 16, further comprising a pair of guidewire lumens, each one of said pair of guidewire lumens formed in a lateral side portion of the bifurcated distal portion and wherein said first axial bore and said second axial bore are disposed spaced from an axial center of the first tip electrode and the second tip electrode, respectively, and generally in alignment with said pair of guidewire lumens.

19. A medical lead according to claim 18, further comprising a bi-lumen delivery catheter adapted to slidingly receive the bifurcated distal portion and wherein said first guidewire and said second guidewire are not encased within said bi-lumen delivery catheter.

20. A medical lead according to claim 19, further comprising a resilient co-axial coil-type conductor disposed within a proximal portion of the medical lead, said co-axial coil-type conductor diverging into two independent coil-type conductors and wherein each of said two independent coil-type conductors are disposed in a separate one of the bifurcated portion of the medical lead.

21. A computer readable medium for storing executable instructions for performing a method, comprising:

a) instructions for applying pacing-level electrical stimulation to a portion of myocardial tissue from a single pair of at least three electrode pairs, wherein said at least three electrode pairs electrically couple to a single **elongated**? medical **electrical** lead;

b) instructions for sensing a resulting depolarization wavefront between at least two of said at least three electrode pairs;

c) instructions for adjusting a temporal interval parameter based at least in part on the sensing of the resulting depolarization wavefront and instructions for repeating step a) and step b) until an acceptable depolarization wavefront is sensed; and

d) in the event that no depolarization wavefront is sensed, instructions for repeating step a) with a different single pair of said at least three electrode pairs.

22. A medium according to claim 21, further comprising:

instructions for sensing a mechanical property of said myocardial tissue and providing a mechanical output signal related to the mechanical property;

instructions for conveying said mechanical output signal to an implantable pulse generator; and

based at least in part on the mechanical output signal, instructions for repeating step c).

23. A method of reconfiguring electrical communication among at least three electrode pairs coupled to a portion of a reconfigurable medical electrical lead, said medical electrical lead adapted to couple to a single cardiac chamber, comprising:

a) applying pacing-level electrical stimulation to a portion of myocardial tissue from a single pair of at least three electrode pairs, wherein said at least three electrode pairs electrically couple to a single elongated medical electrical lead;

b) sensing a resulting depolarization wavefront between at least two of said at least three electrode pairs;

c) adjusting a temporal interval parameter based at least in part on the sensing of the resulting depolarization wavefront and repeating step a) and step b) until an acceptable depolarization wavefront is sensed; and

d) in the event that no depolarization wavefront is sensed, repeating step a) with a different single pair of said at least three electrode pairs.

24. A method according to claim 23, wherein said segment of myocardial tissue comprises a ventricle, and wherein each of said at least three pairs of electrodes each couple to a one of:

in an anterior plane of said myocardial tissue: an apical volume, a mid-basal volume, a basal volume,

in a lateral plane of said myocardial tissue: an apical volume, a mid-basal volume, a basal volume,

in an inferior or posterior plane of said myocardial tissue: an apical volume, a mid-basal volume, a basal volume.

25. A method according to claim 24, wherein said ventricle comprises a LV.

26. A method according to claim 25, wherein the at least three pairs of electrodes are all disposed in a vessel extending from the coronary sinus os.

27. A method according to claim 26, further comprising:

sensing a mechanical property of said myocardial tissue and providing a mechanical output signal related to the mechanical property;

conveying said mechanical output signal to an implantable pulse generator; and

based at least in part on the mechanical output signal, repeating step c).

28. A system according to claim 11, wherein said switching means comprises a modulator/demodulator units and further comprises: means for resuming stimulation and contraction of the cardiac tissue at the alternate segment via the said individually addressable electrodes.